

See back cover for an English translation of this cover

2

91156M



911565



NEW ZEALAND QUALIFICATIONS AUTHORITY  
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD  
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

SUPERVISOR'S USE ONLY

Tohua tēnei pouaka mēnā  
KĀORE koe i tuhi kōrero  
ki tēnei pukapuka

## Mātai Koiora, Kaupae 2, 2022

### 91156M Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau

Ngā whiwhinga: E whā

Paetae	Kaiaka	Kairangi
Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau.	Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau, kia hōhonu.	Te whakaatu māramatanga ki ngā tukanga ora i te taumata pūtau, kia tōtōpū.

Tirohia kia kitea ai e rite ana te Tau Ākonga ā-Motu (NSN) kei runga i tō puka whakauru ki te tau kei runga i tēnei whārangi.

**Me whakamātau koe i ngā tūmahi KATOĀ kei roto i tēnei pukapuka.**

Ki te hiahia wāhi atu anō koe mō ō tuhinga, whakamahia ngā whārangi wātea kei muri o tēnei pukapuka.

Tirohia kia kitea ai e tika ana te raupapatanga o ngā whārangi 2–19 kei roto i tēnei pukapuka, ka mutu, kāore tētahi o aua whārangi i te takoto kau.

Kaua e tuhi ki tētahi wāhi e kitea ai te kauruku whakahāngai (✂). Ka poroa pea taua wāhi ka mākahia ana te pukapuka.

**HOATU TĒNEI PUKAPUKA KI TE KAIWHAKAHAERE Ā TE MUTUNGA O TE WHAKAMĀTAUTAU.**

**TE TŪMAHI TUATAHI: TE AHOTAKAKAME**

Me whai pūmatū hohe tauwhāiti ngā tipu katoa hei tīmata i te tukanga o te ahotakakame.



Te mātāpuna: <https://www.doc.govt.nz/nature/native-plants/>

- (a) Whakaahuatia ngā pūmatū hohe me mātua whai mō te ahotakakame ME te ara e uru ai ērā ki te tipu.

---

---

---

---

**QUESTION ONE: PHOTOSYNTHESIS**

All plants require specific reactants to start the process of photosynthesis.



Source: <https://www.doc.govt.nz/nature/native-plants/>

- (a) Describe the reactants required for photosynthesis AND how they enter the plant.

---

---

---

---

He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā

Mātai Koiora 91156M, 2022

- (b) Photosynthesis takes place inside the chloroplasts. The main structures involved in photosynthesis are: the outer membrane, inner membrane, stroma, thylakoid membrane, and grana.



Adapted from: [www.mcqbiology.com/2013/04/multiple-choice-questions-on-chloroplast.html](http://www.mcqbiology.com/2013/04/multiple-choice-questions-on-chloroplast.html)

Discuss how specific reactants in the light-dependent and light-independent reactions affect the amounts of the products of photosynthesis:

In your answer:

- describe the function of TWO named structures from the chloroplast diagram
- explain how the structures of the chloroplast are built to help them carry out their function
- discuss how the structures of the chloroplast work together to carry out the process of photosynthesis.

*There is more space for  
your answer to this question  
on the following pages.*

*There is more space for  
your answer to this question  
on the following pages.*





I tētahi whakamātautanga o te pānga o te pH ki te mahi a ngā pūmua whākōkī i roto i ngā pūtau *Elodea*, i puta ngā kitenga e whai ake nei.

Mātai Koiora 91156M, 2022









## TE TŪMAHI TUATORU: TE TUKUPŪNGAO A TE PŪTAU

Ka rewa ngā torongū waeroa ki te kārewa o te wai, ā, ka mitia te hāora mā tētahi ngongo hā. Ina whakaraerae, ka heke iho ngā torongū ki te takere o te hāroto ki reira miti ai i te hāora memeha i te wai.

He kōataata ngā torongū waeroa, ā, e taea ana te kite ō rātou manawa e kakapa ana i raro i tētahi karu whakarahi. E taea ana te nui o ngā kakapa manawa i te meneti te whakamahi hei huarahi ine i te pāpātanga tukupūngao ā-pūtau o ngā pūtau manawa, hei mātai hoki i ngā āhuatanga e whai pānga ana ki tērā.



Te mātāpuna: [https://en.wikipedia.org/wiki/File:Culex\\_sp\\_larvae.png](https://en.wikipedia.org/wiki/File:Culex_sp_larvae.png)

- (a) Whakaahuatia te pūtake o te tukupūngao a te pūtau.

---



---

- (b) Nō te nui o te hāora i te wai ka heke, ka heke anō ko te pāpātanga tukupūngao, ā, nā konā, ka heke te hoto manawa. I ngā wā hoki KĀORE he hāora e toe ana i te wai, ka kakapa tonu ngā manawa o ngā torongū waeroa.

	Ngā kakapa manawa i te meneti me ngā panonitanga ki ngā kukūtanga hāora memeha i roto i te wai hāroto				
Te kukūtanga hāora memeha (% o te kuo)	0	25	50	75	100
Te nui o ngā kakapa manawa i te meneti (bpm)	20	40	50	60	120

Matapakina ngā kitenga i runga e hāngai ana ki te tukupūngao ā-hāora me te tukupūngao hāora-kore, me te pānga o ērā ki ngā kakapa manawa o te torongū waeroa.

I tō tuhinga, me kōrero mō te tūtohi raraunga, me whakauru hoki:

- tētahi whakaahuatanga o te wāhi ki te tukupūngao ā-hāora me te tukupūngao hāora-kore i roto i te pūtau
- tētahi whakamāramatanga o ngā tukanga tukupūngao e RUA tae atu ana ki ngā matū me mātua kite mō ia tukupūngao me ngā hua o ērā
- me āta whakamārama hoki ngā pānga pea ka tau ki te kakapa manawa o te torongū me te momo tukupūngao ina pāngia e te 0% hāora mō tētahi wā e roa ake ana i ngā hāora ruarua.

### QUESTION THREE: CELLULAR RESPIRATION

Mosquito larvae come to the surface of the water and absorb oxygen through a breathing tube. When threatened, the larvae retreat to the bottom of the pond where they can absorb dissolved oxygen from the water.

Mosquito larvae are transparent, and it is possible to observe their hearts beating under a microscope. The number of heart beats per minute can be used as a way to measure the cell respiration rate of the heart cells, and to study the factors that affect it.



Source: [https://en.wikipedia.org/wiki/File:Culex\\_sp\\_larvae.png](https://en.wikipedia.org/wiki/File:Culex_sp_larvae.png)

- (a) Describe the purpose of cellular respiration.

---



---

- (b) As oxygen levels in the water decrease, respiration rate, and therefore heart rate decreases. Even when the water has NO oxygen left, the mosquito larvae's hearts could continue to beat.

	Heart beats per minute with changing dissolved oxygen concentrations in pond water				
Dissolved oxygen concentration (% saturation)	0	25	50	75	100
Number of heart beats per minute (bpm)	20	40	50	60	120

Discuss the observations above in relation to aerobic and anaerobic respiration, and their effect on the mosquito larvae's heart rates.

In your answer, refer to the data table and include:

- a description of where aerobic and anaerobic respiration take place in the cell
- an explanation of BOTH respiration processes that includes the materials required for each and their products
- elaborate on the possible effects on larval heart rate and type of respiration when exposed to 0% oxygen for more than a few hours.

*He wāhi anō mō tō tuhinga  
mō tēnei tūmahi kei ngā  
whārangi e whai ake nei.*

*There is more space for  
your answer to this question  
on the following pages.*







**He whārangi anō ki te hiahiatia.  
Tuhia te tau tūmahi mēnā e hāngai ana.**

TE TAU  
TŪMAHI

**Extra space if required.**  
**Write the question number(s) if applicable.**

QUESTION  
NUMBER

*English translation of the wording on the front cover*

## Level 2 Biology 2022

### 91156M Demonstrate understanding of life processes at the cellular level

Credits: Four

91156M

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

**You should attempt ALL the questions in this booklet.**

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–19 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (▨). This area may be cut off when the booklet is marked.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**